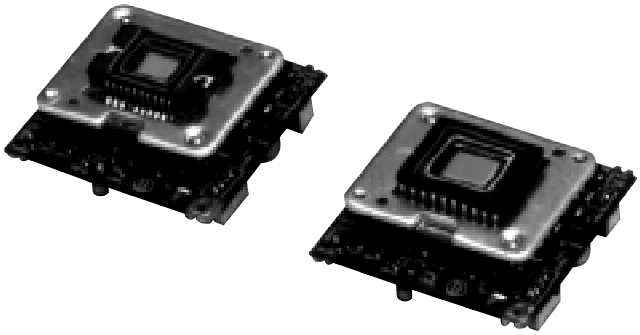
SONY

COMPACT MONOCHROME CARD CAMERA

CCB-M series

- CCB-M25/M25CE
- CCB-M35A/M35ACE
- CCB-M27B/M27BCE
- CCB-M37/M37CE



Instruction Manual

(Ver. 2.0) — English —

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GENERAL

General Descriptions

CCB-M Series are the “Compact Monochrome Card Camera” realized by high density surface mounting technology. “M25” & “M27B” have 1/2" CCD. “M35A” & “M37” have 1/3" CCD. “M27B” & “M37” are high-resolution version. “CE” means the CCIR model.

These Card Cameras are constructed with two boards, one board comes with CCD image sensor and the Aluminum plate for the lens mounting (named “CCD board”), another board comes with the processing components (named “Process board”).

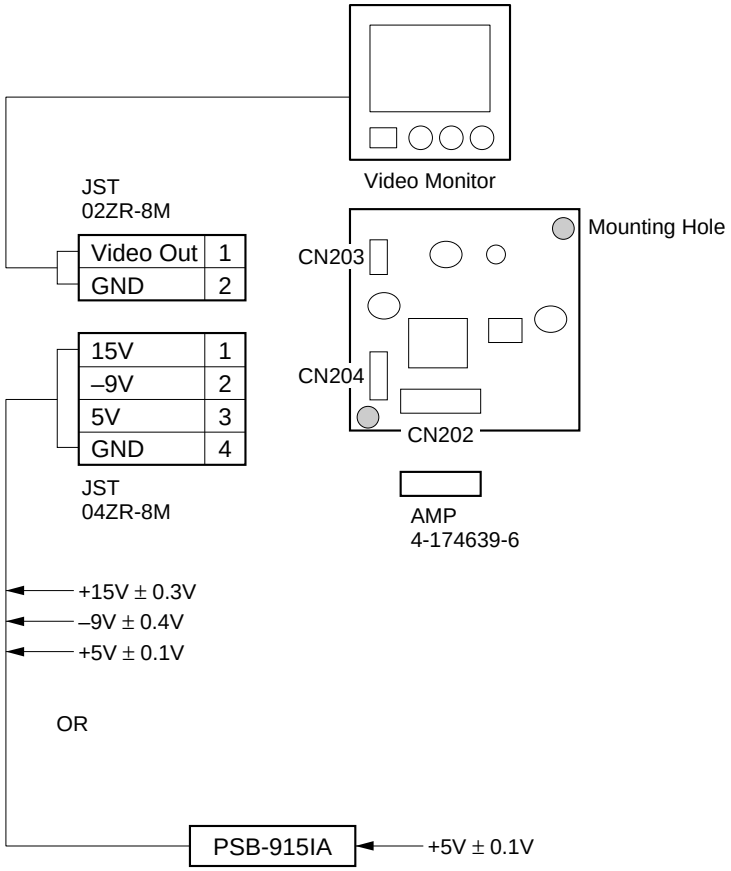
By connecting 16P connector (CN202) to additional circuit or modification, electronic shutter speed adjustment, AGC ON/OFF selection, external synchronization working and so on are possible.

Standard Connection

Connectors of CN203 (Video Out) and CN204 (Power In) are the 1.5mm pitch ZR series made by Nihon Attyaku Tanshi.

Connector of CN204 is supplied in PSB-915IA (power supply board / optional accessories).

As a recommended power supply board, PSB-915IA is available. PSB-915IA has a 5V input and 3 outputs for CCB cameras.



SPECIFICATIONS

Main Specifications

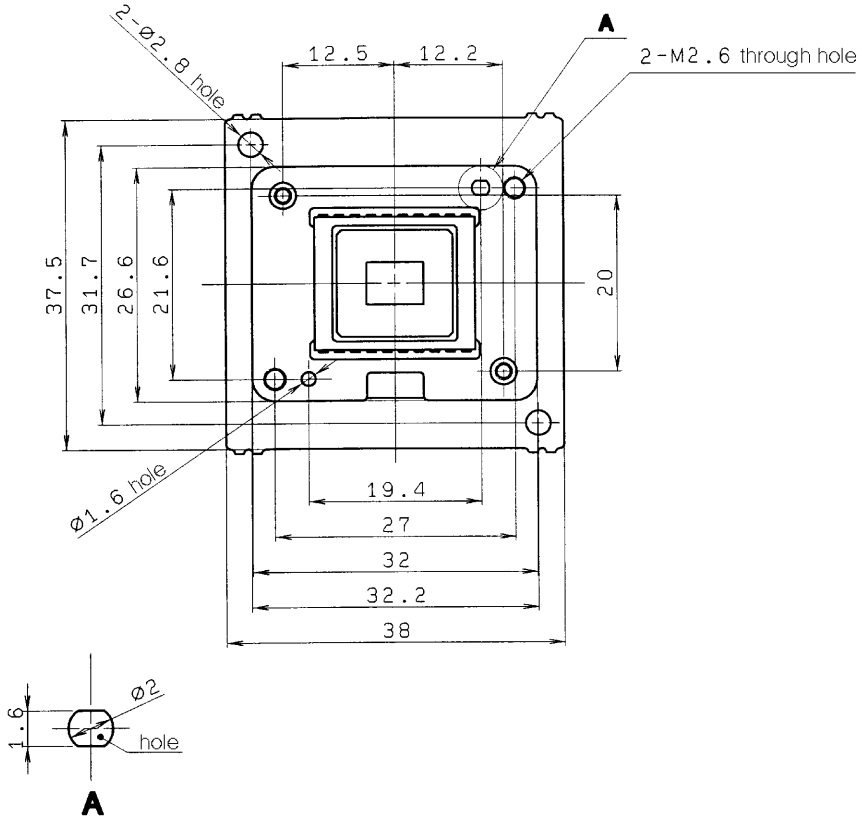
Model Name (EIA) (CCIR)	CCB-M25 CCB-M25CE	CCB-M35A CCB-M35ACE	CCB-M27B CCB-M27BCE	CCB-M37 CCB-M37CE
Image Sensor	Monochrome Interline transfer CCD			
	1/2"	1/3"	1/2"	1/3"
Effective Pixels	510 (H) × 492 (V) : EIA 500 (H) × 582 (V) : CCIR		768 (H) × 494 (V) : EIA 752 (H) × 582 (V) : CCIR	
H. Resolution	380 TVL		570 TVL	
Min. Illumination	0.3 lx/F1.2	0.2 lx/F1.2	0.25 lx/F1.2	0.3 lx/F1.2
Sensing Area (EIA)	6.48 × 4.82	4.9 × 3.69	6.45 × 4.84	4.88 × 3.66
(unit : mm) (CCIR)	6.35 × 4.83	4.9 × 3.67	6.47 × 4.83	4.89 × 3.64
Scanning System	2 : 1 Interlaced			
Sync. System	Internal			
Electronic Shutter	1/60 to 1/10000sec. (EIA)		1/50 to 1/10000sec. (CCIR)	
S/N Ratio	more than 48 dB (AGC OFF)			
Video Out	1.0 Vp-p / 75 Ω Composite			
Power Requirements	+ 5 ± 0.1Vdc : less than 100mA + 15 ± 0.3Vdc : less than 15mA – 9 ± 0.4Vdc : less than 10mA The ripple voltage should be less than 5mVp-p.			
Operating Temperature	– 10˚C to 50˚C			
Storage Temperature	– 40˚C to 60˚C			
AGC	ON/OFF (w/modification)		OFF	
GAMMA	0.45 approx. (w/modification)		1	
Packing	Sub carton : 10pcs Master carton : 50pcs			
Dimensions	Process board : 38.0 (H) × 37.5 (V) mm CCD board : 32.0 (H) × 26.6 (V) mm			
Weight	17 g			

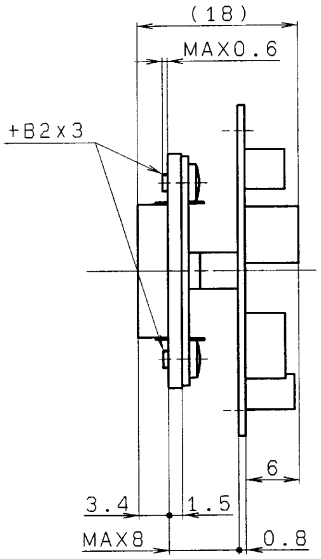
SPECIFICATIONS

Dimensions

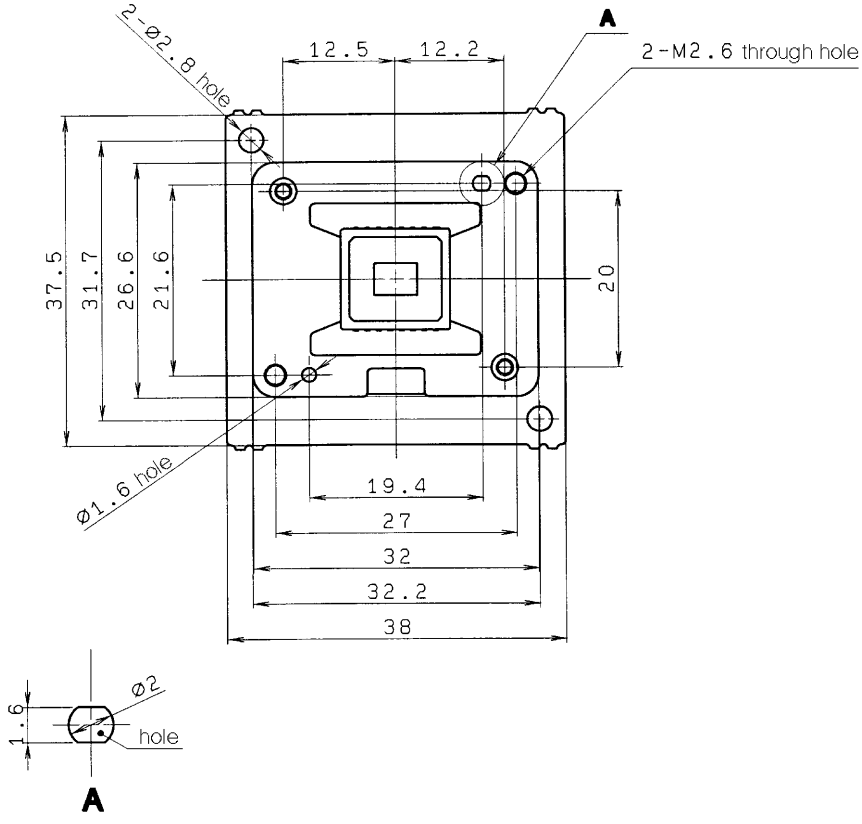
unit : mm

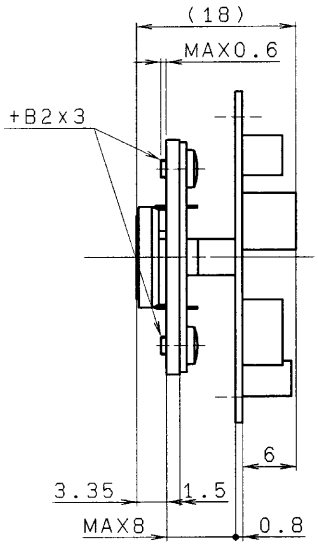
◇ CCB-M25/CE, CCB-M27B/CE





◇ CCB-M35A/CE, CCB-M37/CE





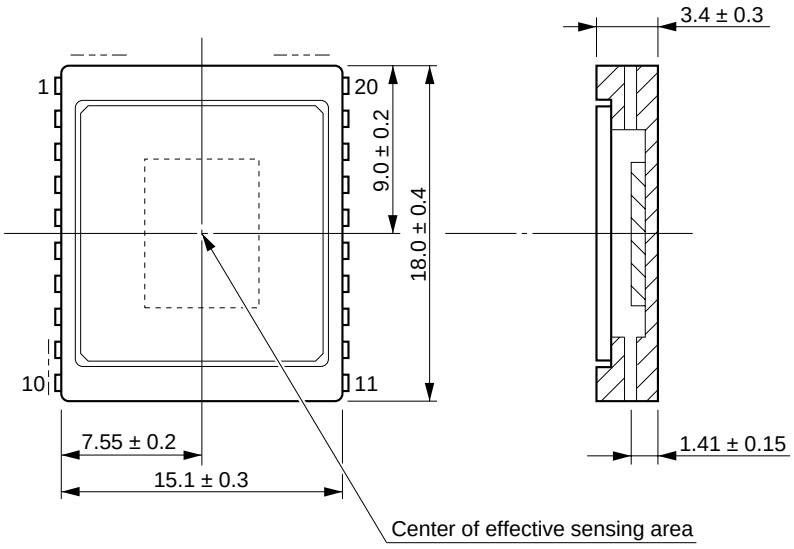
• Note : Make space over the screw B2 of CCD board as the screw projects from the Aluminum plate by max 0.6mm.

SPECIFICATIONS

CCD Dimensions

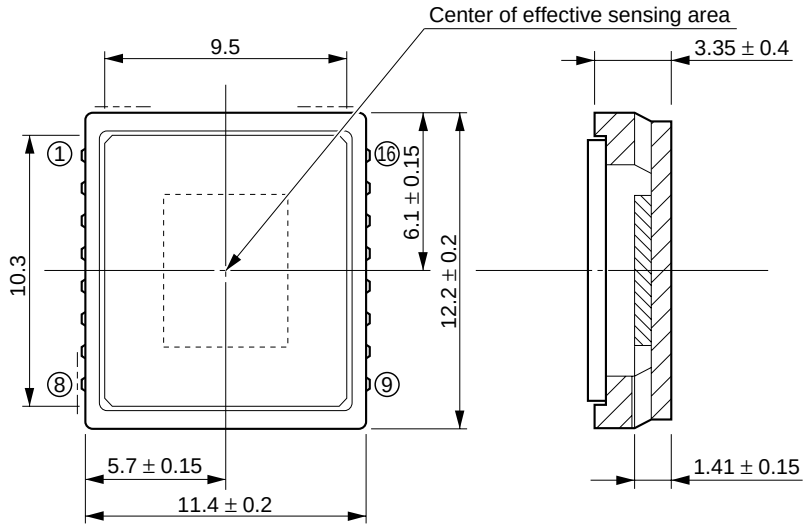
unit : mm

◇ CCB-M25/CE, CCB-M27B/CE



Glass thickness : 0.75mm

◇ CCB-M35A/CE, CCB-M37/CE



Glass thickness : 0.75mm

unit : mm

SPECIFICATIONS

Input / Output Terminal

Connector No. are on Process board

◇ **CN201 : 18P Connect CCD board and Process board**
◇ **CN202 : 16P for Extentional functions <refer to 5-1>**
◇ **CN203 : 2P Video Out**

Pin No.	Descriptions	Mating Plug
1	Video Out 75Ω 1.0Vp-p	JST 02ZR-8M
2	GND	

◇ **CN204 : 4P Power Supply In**

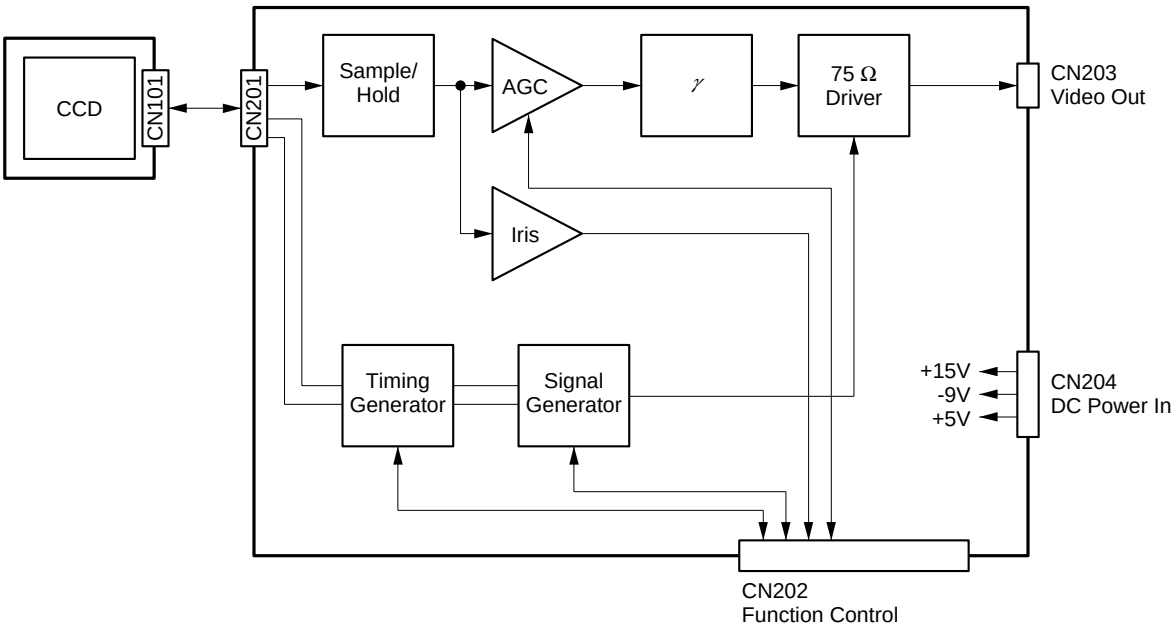
Pin No.	Descriptions	Mating Plug
1	+15 +/- 0.3 VDC	JST 04ZR-8M
2	-9 +/- 0.4 VDC	
3	+5 +/- 0.1 VDC	
4	GND	

SPECIFICATIONS

Durability

<table>
<tr><th>Item</th><th>Conditions</th><th>Specifications</th></tr>
<tr><td>Vibration</td><td>Only endurance conditioning by a frequency sweep shall be made.
The entire frequency range, from 10Hz to 55Hz and return to 10Hz shall be transversed in 1 min with an amplitude (total excursion) of 1.5mm.
This vibration shall be applied for a period of 2h in each of 3 mutually perpendicular axes (a total of 6h).
Refer to IEC Pub. 68-2-6 for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td>Shock</td><td>Peak acceleration : 40G
Duration of pulse : 6ms
Three successive shocks shall be applied in both directions of 3 mutually perpendicular axes (a total of 18 shocks).
Refer to IEC Pub. 68-2-27 for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td>Cold</td><td>The specimen shall be stored at a temperature of -25±3˚C for 6h and then subjected to standard atmospheric conditions for 1h.
After this procedure, measurements shall be made.
Refer to IEC Pub. 68-2-1 Test Ab for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td>Dry heat</td><td>The specimen shall be stored at 85±2˚C for 6h and then subjected to standard atmospheric conditions for 1h.
After this procedure, measurements shall be made.
Refer to IEC Pub. 68-2-1 Test Bb for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td>Damp heat</td><td>The specimen shall be stored at 40±2˚C and a relative humidity of 90% to 95% for 96 +4h and then subjected to standard atmospheric conditions for 1h.
After this procedure, measurements shall be mode.
Refer to IEC Pub. 68-2-3 for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td>Change of temperature</td><td>The specimen shall be subjected to 5 continuous cycles, each as shown in the table below.
Following the final cycle, the specimen shall be stored at standard atmospheric condition for 1h, after which measurements shall be made.
<table>
<tr><th></th><th>Temperature</th><th>Duration</th></tr>
<tr><td>1</td><td>-25 ±3˚C</td><td>30 min.</td></tr>
<tr><td>2</td><td>Standard atmospheric conditions</td><td>10 to 15 min.</td></tr>
<tr><td>3</td><td>70 ±2˚C</td><td>30 min.</td></tr>
<tr><td>4</td><td>Standard atmospheric conditions</td><td>10 to 15 min.</td></tr>
</table>
Refer to IEC Pub. 68-2-3 for other procedures.</td><td>No distinct looseness of terminals or visible deformation.
Electrical characteristics shall be satisfied.</td></tr>
<tr><td colspan="3">NOTE : This data is based on the board each.
In assembled, the data on Shock, Vibration are to be changed according to the housing.</td></tr>
</table>

BLOCK DIAGRAM



PRECAUTIONS

Note in Turning ON

When using PSB-915IA, do not need to care following note.
Regarding the turning on, **-9V must be supplied later**.
When turning off, **-9V must be off first or in the same time with other powers**.
Otherwise -9V is remained, the IC might be broken.

Note in handling CCD

- Static charge prevention
  CCD image sensors are easily damaged by static discharge. Before handling, be sure to take the following protective measures.
  - Use an earth band in handling by hands.
  - Install a conductive mat on the floor or working table to prevent the generation of static electricity.
  - For the shipment of mounted substrates, use boxes treated for the prevention static charges.

- Dust and dirt protection
  - Operate in clean environments.
  - Do not either touch glass plates by hand or have any object come in contact with glass surface. Should dirt stick to a glass surface blow it off with an air blow.
  - Clean with cotton bud and ethyl alcohol if the glass surface is grease stained. Be careful not to scratch the glass.
  - Remove a protective tape on the CCD to be applied for electrostatic protection, before the use. Do not reuse the tape.

- Do not expose to strong light (sun rays) for long periods.

- Exposure to high temperatures or humidity will affect the characteristics.
  Accordingly avoid storage or usage in such conditions.

- CCD image sensor is precise optical equipment that should not be subject to mechanical shocks.

PRECAUTIONS

Note For the Installation

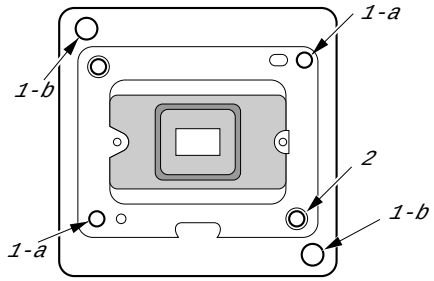
It is referred not to make the boards stressed, when installing / removing the connectors. The boards should not be curved for fear of the cracks on the soldering, and of the broken components.

- When installing into the housing/ chassis, please fix the following points.

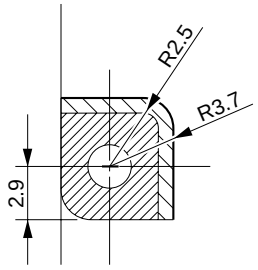
  1) Fix with the M2.6 screws at the screw holes (1-a, 2holes) on an Aluminum plate of CCD board. (Ref. No.1)
  2) Connect CCD board and Process board with a connector, then fix Process board to 1-b (ø2.8, 2holes) with M2 screws. (Refer to the dimensions.)
     Fix the shadow part on Process board. (Ref. No.2)

- The screw head which is fixing the Aluminum plate and Process board rises on the Aluminum plate by Max. 0.6mm. The housing / chassis have to be made in covering the head.

- CCD board and Process board are adjusted each as a set. Please use it as the set, delivered conditions.



No.1



No.2
Ref. Camera's dimensions

EXTENTIONAL FUNCTIONS

Pin Assignment of CN202

Pin No.	Code		Description	Preset	Typ.	Max.	Unit.
1	IRIS OUT	O	Iris Out / DC 1.3V		700	800	mVp-p
2	DET OUT	O	Det Out / DC 2.0V		500	1500	mVp-p
3	GAIN CONT	I	AGC Control Voltage In	See the graph			
4	TEST 1	I		H			
5	D0	I	Shutter Speed Data Set	H	*1		V
6	D1	I	Preset : H	H	*1		V
7	D2	I		H	*1		V
8	TEST 2	O					
9	EXT	I	Internal Sync. (L) / External Sync.(H) Preset : L	L	*1		V
10	HR	I	Horizontal Reset In	*1			V
11	VR	I/O	Vertical Reset In (External Sync Mode) Field Pulse Out (Internal Sync Mode)	*1			V
12	HD	O	HD Out	*2			V
13	VD	O	VD Out	*2			V
14	ID	O	Line Discrimination	*2			V
15	GND						
16	CLK IN	I/O	28MHz clock out (Internal Sync. Mode)				

	Item	Symbol	Conditions	Min.	Max.	Unit.
*1	Input Voltage	V IH		0.7 V DD		V
		V IL			0.3 V DD	V
*2	Output Voltage	V OH	I OH = -2 mA	4.0		V
		V OL	I OL = 4 mA		1.0	V

Auto Iris Lens Function

When using an Auto Iris Lens which has an amplifier, use 1P at CN202 (IRIS OUT) as control Video signal.

* Recommended Auto Iris Lens, optional accessory :
  Named CCL-M03XE, CCL-M05XE, CCL-M07XE. CCL-M lenses are necessary for the Power Supply Board, named PSB-915IA.

EXTENTIONAL FUNCTIONS

Modification of Auto Gain Control

Preset is AGC ON.(CCB-M25/CE, CCB-M35A/CE)

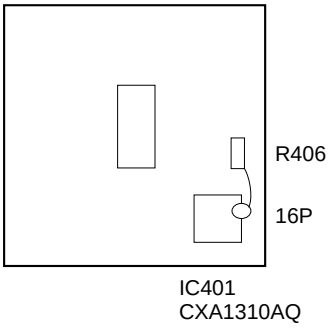
◇ **AGC OFF**

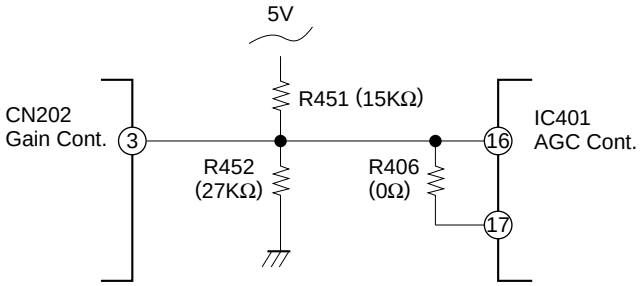
Remove R406 (0Ω) at 16P of CXA1310AQ on Process board, then make there OPEN. GAIN is fixed.

◇ **AGC Manual Control**

Remove R406, R451 and R452. Supply the proper voltage to 3P at CN203 (GAIN CONT.).

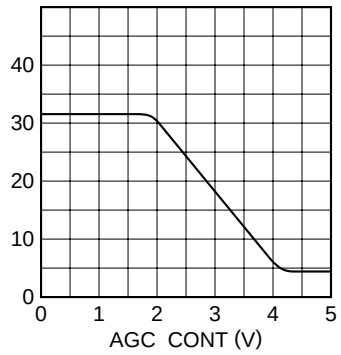
Ref: AGC Control Characteristics





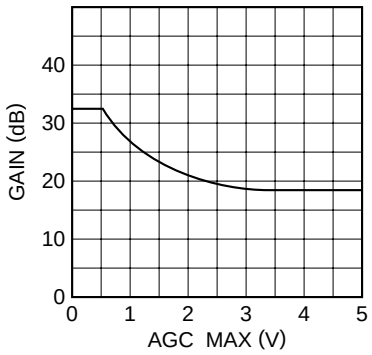
● AGC Manual Control characteristics

AGC control characteristics



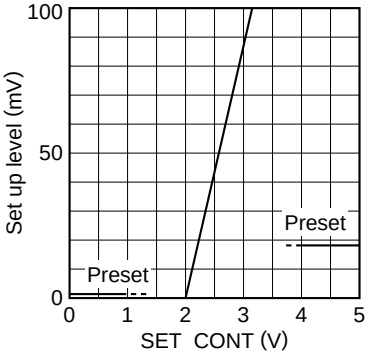
CN202③

AGC MAX control characteristics (RV403)



IC401⑭

Set up control characteristics (RV401)



IC401⑤

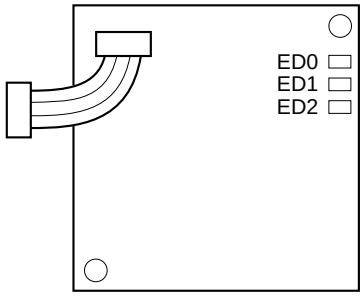
<Pedestal Control characteristics>

Electronic Shutter Control

Preset is normal shutter speed (EIA : 1/60 sec., CCIR : 1/50 sec.)

With reference below table, connect 5P (D0), 6P (D1) and/or 7P (D2) at CN202 to GND, as preset of each terminals are high.

On the PSB-915IA, short lands for settling the electronic shutter by connecting the lands. The terminal connect to ground.



ED0	ED1	ED2	Shutter Speed
H	H	H	1/60 or 1/50 sec.
L	H	H	1/100 sec.
L	H	H	1/120 sec.
H	L	H	1/250 sec.
L	L	H	1/500 sec.
H	H	L	1/1000 sec.
L	H	L	1/2000 sec.
H	L	L	1/4000 sec.
L	L	L	1/10000 sec.

H : OPEN, L : GROUND

EXTENTIONAL FUNCTIONS

External Synchronization

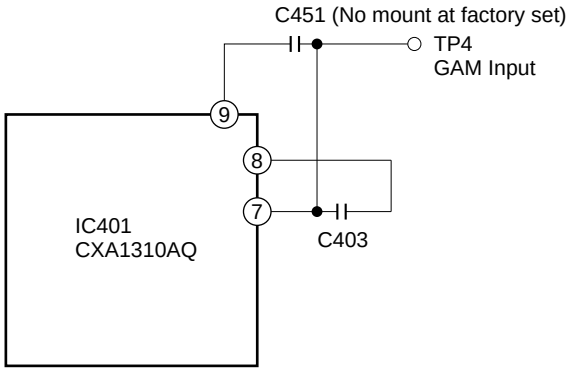
CCB-M series camera's factory set are Internal sync. only.
They are, however, able to be modified to External synchronization camera, with adding External generator circuit.

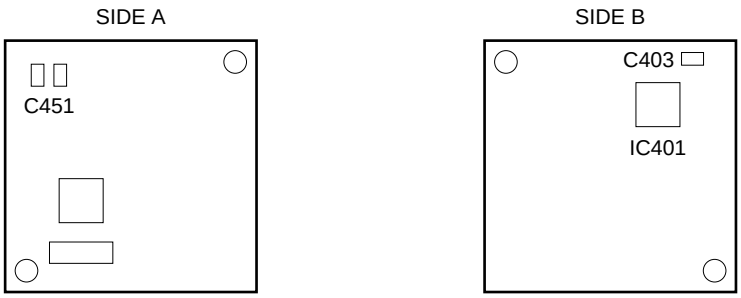
1. Change the voltage 9P (EXT.) at CN202 from Low (0V) to High (5V).
2. By this change, IC301 can accept HR/VR signal.
3. Remove R305 and make there Open. R305 is a resister to supply internal clock.
4. Supply 28MHz clock synchronizing HD of 12P on CN202 and with external sync. source to CN202 16P (CLK IN) .
5. Supply VD signal inputting from External sync. source to CN202 11P (VR).

Ref : Circuit example for VS Gen-Lock

Gamma (CCB-M25/M25CE, CCB-M35A/M35ACE)

C403 which is on 7P at IC401 on Process board is to be re-mounted into C451. This case, it is necessary to re-adjust AGC.
Remove C403 on B side. Then mount a same type of chip condenser (0.1μF) at C451 on A side.
GAMMA should be set to "1".





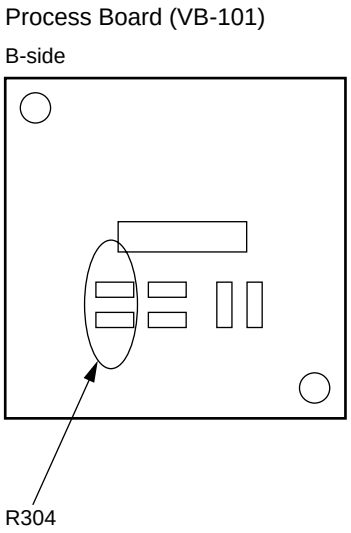
EXTENTIONAL FUNCTIONS

Field / Frame Accumulation

It is possible to change CCB-M27B/M27BCE and CCB-M37/M37CE from field accumulation mode to frame accumulation mode. It needs the following modification.

Please note that this modification is effective only for CCB-M27B/M27BCE and CCB-M37/M37CE.

- Mount the resister (10K) on R304 of Process Board (VB-001) at B-side.



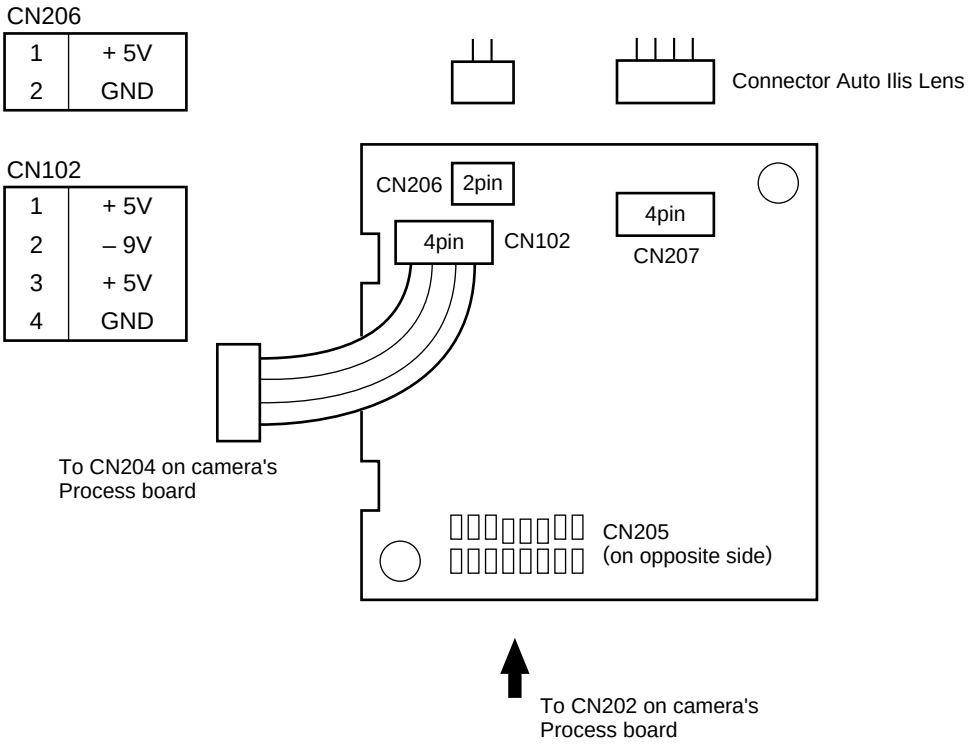
OPTIONAL ACCESSORIES

PSB-915IA / Power Supply Board

PSB-915IA is Power Supply Board which produce +15V and -9V by supplying DC5V In. It contains a drive circuit for the optional Auto Iris Lenses.

NOTE : It needs to adjust PSB-915IA when using CCL lenses as follows.
Adjust RV201 on PSB-915IA to change 1pin of CN205 (Iris Out) to
800mVp-p (object : gray scale chart)

1) Connect CN205 (16P) and CN202 on Camera's Process board with board to board connector.
2) Connect CN102 (4P) and CN204 on Camera's Process board.
3) Supply DC5V to CN206.
4) When using the Auto Iris Lens (optional accessory), connect CN207 (4P) and the connector of Auto Iris Lens.



◇ Specifications

Input : DC5V +/- 0.1V 180mA
Output : +5V (directly from Input)
+15V 10mA
-9V 10mA
Dimensions : 38.0 X 37.5 (mm)

OPTIONAL ACCESSORIES

CCL-M03XE, CCL-M05XE, CCL-M07XE / Auto Iris Lens

In assembling with these Auto Iris Lenses, Power Supply Board and CCB-M cameras, the simple camera constructions are realized.

There are 3 kinds of the lenses prepared according to the focal length.

	Focal Length	H View Angle	
		1/2"CCD	1/3"CCD
CCL-M03XE*	f = 3.6 mm	91.1˚	68.3˚
CCL-M05XE*	f = 5.0 mm	67.0˚	50.3˚
CCL-M07XE*	f = 7.5 mm	46.8˚	35.1˚

F = 1.6

* These products are available with limited quantity.
Auto Iris Lens, CCL-M03XE, CCL-M05XE, CCL-M07XE.

CCE-50M, CCE-150R / Extension Cable

These are flexible cables to remote CCD board from Process board, with connecting CN101 and CN201.

Length CCE-50M 50mm
CCE-150R 150mm

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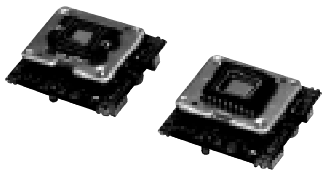
CCB-M series

- **CCB-M25/M25CE**
- **CCB-M35A/M35ACE**
- **CCB-M27B/M27BCE**
- **CCB-M37/M37CE**



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